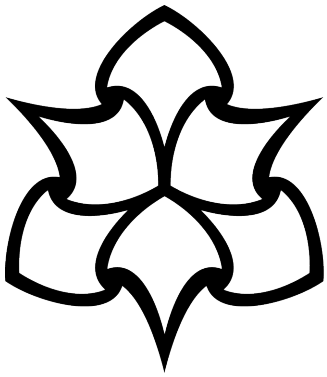

CAN SOCIAL NETWORKS EXPLAIN ETHNIC LABOUR MARKET SEGMENTATION?

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Abstract. It has been widely reported that post-World War II migration to 'western' countries has gone hand-in-hand with the development of ethnically segmented labour markets, particularly in low-skill roles where entry requirements are minimal. Whilst numerous theories have been forwarded as to why such situations occur, it has remained difficult to empirically test such conceptualisations because of the numerous interacting processes, which produce segmentation in the labour market.

In this paper, we attempt to address this issue through the use of an agent-based model inspired by Waldinger & Lichter's networked explanation for segmentation in low-skilled work in Los Angeles, presented in their seminal book, *How the Other Half Works*. This work was chosen because the core argument it presents – that social networks have a profound impact on the emergence of labour market segmentation – has been widely cited and supported by scholars working in the fields of international migration and labour market studies.

Keywords. Labour market segmentation, social networks, migration, agent-based modelling

Introduction

Migration studies scholars have long observed that some level of segmentation occurs amongst low-skill roles in labour markets where large numbers of migrants are received (see e.g. [7] [9] [10]). However, whilst this is occasionally due to a specific and sustained attempt by the receiving country to attract and limit immigrant workers to certain restricted roles, it is more commonly an emergent phenomenon. Many academics have forwarded theories as to why ethnic labour market segmentation may arise – often based on empirically sound, quantitative or qualitative, evidence – but the interconnected and overlapping nature of the causal processes involved makes it extremely difficult to begin to uncover which proposed theories can be usefully extended to help us understand these processes in other times, spaces and places.

Agent-based modelling provides one promising avenue to do this and has been widely used by those influenced by complexity approaches in the social science [3] [4] [5] [6]. With the work reported here we are currently exploring what we term a 'problem-based' approach to utilising ABMs in social science – an approach with parallels to Edmund Chattoe-Brown's recent overview of the potential of ABMs for theory building and testing in sociology [2]. In this approach, the initial target system to be modelled is determined by the problem under exploration, which itself is drawn from a close reading of contemporary sociological research in the area of concern. Thus the aim moves from building a 'whole world' model, which can be used to test and build sociological understandings of the world, to creating a more abstract model, in which specific scenarios and interdependent relationships can be explored and tested. However, by basing such abstractions on pre-existing theoretical and empirical findings it is possible to retain relevance to contemporary sociological debates.

Model Framework

In their seminal study of immigration and the social organisation of labour in Los Angeles, Waldinger & Lichter [11] not only provide a neatly defined area of study – LA in the 1990's – but also supply some highly testable scenarios which are interesting, not only from a sociological perspective, but also from a complexity one. For the former, the question could be stated as, 'can social networks *alone* drive ethnic segmentation in a low-skill labour market?' For the latter, we can extend this to include whether such processes are emergent and whether they lock-in over time. These are important

questions in the sociology of immigration and work, because whilst we are well aware such segmentation happens (often rapidly), there is less clarity about the processes that drive it.

Waldinger & Lichter's conceptualisation of how social networks impact on labour market segmentation [11: 83-99] is based on two assumptions: (i) 'Most job-seekers activate their social connections to find jobs', and (ii) 'Employers use ties linking the workers whom they know to the new people they may like to hire'. This suggests two types of agents to be modelled:

1) *Workers* – they look for jobs and are enmeshed in social networks. They can pass information about vacancies through these networks, and also get a boost to their likelihood of getting a job they have heard about through such a connection.
2) *Employers* – they give out jobs and use the social networks of their existing workforce for recruitment. They have a preference for recruiting workers in the same social networks as their existing workforce, as this ensures new recruits are trustworthy and effective.

Additionally, we need to represent:

3) *Social networks* – these connect groups of workers. They provide information about available jobs at the employers of social network group members and an advantage to getting a job where other network members are already employed in an organization.)

The model is initiated in a scenario similar to the early 1960's in LA – low-skilled jobs are arranged in a variety of small, medium and large organisations (based on [11: Table A9]). Most of these jobs are initially filled by a native majority population ('Whites'), who slowly vacate the jobs as they retire or find a better position elsewhere – equivalent to a white working class moving up the labour market hierarchy in the post-war era [11: 9]. The rest of the filled jobs are initially taken by a native minority group ('Blacks'). A small number of seed-corn immigrant agents are also present – equivalent to 'pioneer' Latino and Asian immigrants – who visit organisations looking for work. All agents are initiated with, on average, 3 network ties[1] with agents in geographic proximity who share their ethnicity. Agents then have access to information regarding job vacancies at the organisations of linked agents.

Employers collect 'job applications' every tick (1 week) and employ their chosen agent. They have a preference for those 'recommended' by their employees[2], i.e. those with network ties to these employees. Employed agents may then form new links with co-ethnics with whom they work – though agents do not form cross-ethnic links in this model, mimicking initial linguistic barriers.

The immigration rate of the two non-native ethnic groups depends on the labour market success of co-ethnics already in the model – the lower the unemployment rate, the higher the immigration rate. However, once employment falls below a certain level, immigration will cease until that level is again exceeded (this is subject to a 2-tick information delay) (see, e.g. [10]).

Since the model focuses on the labour market, it only considers a population of working age (18-64 years old). Agents who reach age 65 retire and leave the model. New agents enter the model at age 18 according to the birth rate of their respective ethnicity. Other demographic processes are not within the scope of the model. Possible family or neighbourhood ties are modelled by new agents trying to find a position close to other agents of their own ethnicity and then forming links with them.

Another reason for agents to leave the modelled labour market of low-skill jobs (and thus the scope of the model) is discouragement. If an agent fails to get a job for a set period of time (1 year in the experiments described in this paper) it develops a propensity to give up. This is modelled as a probability of leaving (set to 10%), which is tested every tick once the crucial time period for an agent is reached. Both native (Whites, Blacks) and immigrant agents (Latinos, Asians) can be discouraged.

We calibrated the model using data derived from the LA case study of Waldinger & Lichter [11: 145-156] (composition of the labour market and the worker population) and additional statistical data (birth rates per ethnicity), so that the overall population dynamics of the model correlate with the

[1] The actual number of ties is determined by taking a sample from a normal distribution with mean 3 and standard deviation 1, and then taking the minimum of this sample and the number of co-ethnics in the Moore neighbourhood of depth 5 of the respective agent. Ties are undirected, therefore having one agent form a tie with another agent means that both of them gain a 'friend'. Agents previously placed in the model world may thus gain additional ties to their own initially formed ties, resulting in a highly skewed degree distribution as is typical for social networks.

[2] Usually, the applicant with the most recommendations is chosen. In case of several applicants with the highest number of recommendations, a random one of these is chosen. Agents without recommendations therefore only have a chance of employment if none of the existing employees have any unemployed friends applying for a job at the same time.

trajectories of the numbers of unskilled workers per ethnic group as reported. This was necessary as no data regarding actual immigration rates (i.e. including illegal immigration) was available.

Preliminary Results

Our concern in this paper is to model Waldinger & Lichter's *How the Other Half Works* with particular reference to the impact of homophilic social networks on processes of labour market segmentation in low-skill jobs where formal entry requirements are negligible. Therefore, we focus on the conditions in which ethnic segmentation occurred in the model.

In the standard model described above, employment processes are influenced by both homophilic social networks (workers receive information about vacancies, employers receive recommendations for applicants from existing employees) and spatial effects (unemployed workers without useful ties apply at the nearest firm with vacancies, new agents try to 'settle down' next to other agents of their own ethnic group). To test the impacts of these, we compared this model with model variants without one or both of these influences. In the so-called 'null model' agents do not have social networks and are placed randomly in the model world (a 2D grid); the 'null model with space' just gets rid of social networks, whereas the 'standard model without space' keeps the social networks while placing agents randomly in the world. All models use the same configuration of firms; all experiments have been run for 30 years (1560 ticks).

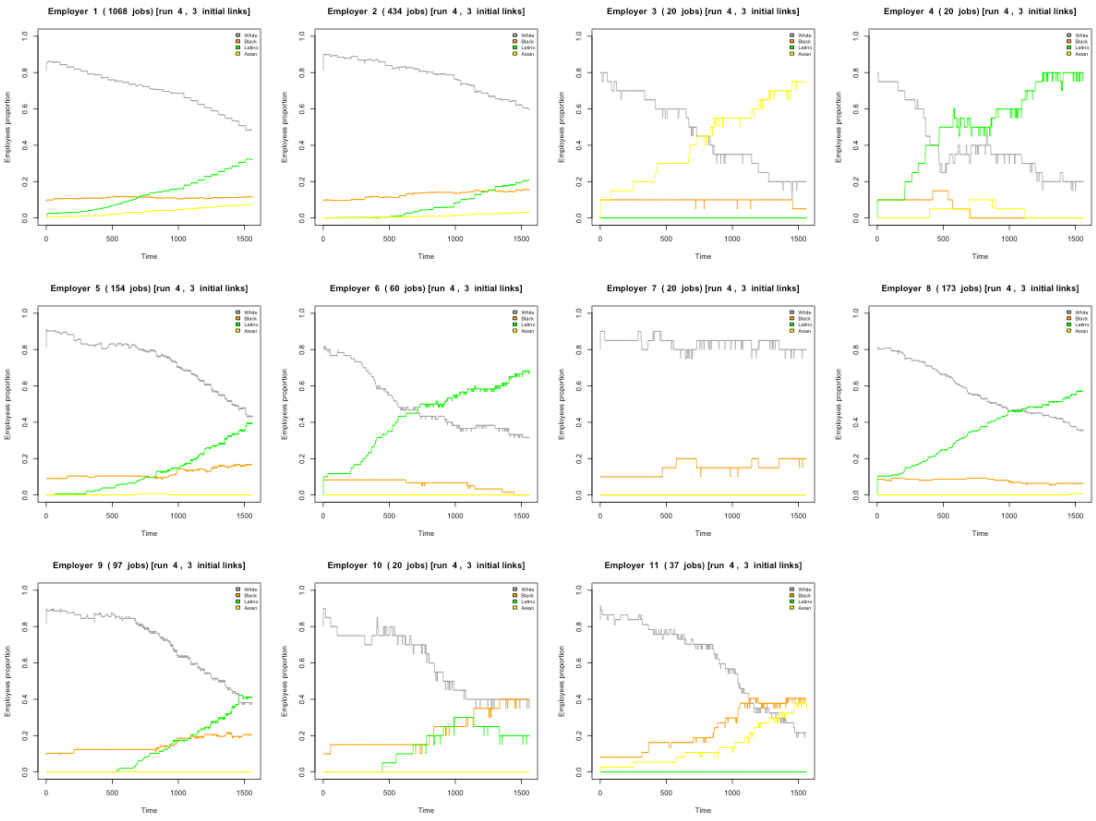

Figure 1: A typical run of the standard model, showing time series of the ethnic proportions of workers of the 11 different employers. Immigrant groups are displayed in green and yellow, while natives are grey and orange.

We find that – as expected and in accordance with Waldinger & Lichter's work – intra-ethnic social networks do support the emergence of segmentation as some organisations can become dominated by one of the initially minority immigrant groups (see Figure 1, employer 3, 4 or 6); once a successful labour market niche is formed, social network processes will tend to reinforce that nascent advantage, leading to the employment of more co-ethnics. It is also possible for organisations dominated by a native ethnic group to 'lock-out' immigrant groups (see Figure 1, employer 7). This is also a feature described in Waldinger & Lichter's work, whereby certain organisations (particularly those with more bureaucratic hiring regulations) tend to remain dominated by native workers. Indeed, it is this process

we are looking to develop in the next iteration of the model – introducing linguistic skills and bureaucratic hiring processes to replicate a more nuanced labour market simulation.

However, space seems to have a non-negligible impact on the model outcomes. While the null model shows no segmentation other than what is to be expected from the overall population dynamics (where the white majority is replaced by a Latino majority over the course of 30 years), in the null model with space segmentation does occur, albeit less pronounced than in the standard model.

Conclusion

Though the 'Other Half' model is clearly a highly abstracted version of the low-skill labour market in Los Angeles, it does illustrate how ABMs can be used to discuss issues of fundamental importance to our understanding of the sociology of immigration and work. Furthermore, it demonstrates that social networks alone can produce emergent labour market segmentation based on ethnically homogenous social networks, even though other processes are of influence too (spatial effects, conditions of labour shortage). This segmentation may not be as extreme as that described in other studies [12], but it does indicate that labour market segmentation (and its persistence) is not only a matter of negative discrimination against immigrants groups, but may also be partially explained by positive discrimination in favour of known and trusted immigrant networks, reinforced by the use of social ties as the pre-eminent source of information about job vacancies in the low-skilled sectors of the labour market. Thus some degree of labour market segmentation persists even when socially discriminatory processes, such as habitus [1], dual interpellation [8] or job queuing [12], are discounted.

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